DOCKET NO.: MSFT-2845/306724.01
Application No.: 10/692,508
Office Action Dated: February 5, 2008

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37 CFR § 1.116

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently amended)   A method for synchronizing a plurality of instances for a data platform, said method comprising:

storing a plurality of items in a first instance of a data platform, each item stored in the first instance includes at least one change unit, wherein the data platform is configured to track changes to change units;

storing, by the first instance of the data platform, a change to a first change unit of a first item, wherein the first item is a child of a parent item and the first item and the parent item are included in the plurality of items;

storing, by the first instance of the data platform after the change to the first change unit of the first item, a change to a parent change unit of the parent item;

uniquely enumerating, by the first instance of the data platform, changes to change units in sequential order, wherein each change unit is identified by a change number;

maintaining, by the first instance of the data platform, a separate vector, wherein the separate vector corresponds to the enumerated change units in sequential order ~~changes to the first instance of the data platform~~, and a most recent known change number of a second instance of the data platform, wherein the separate vector represents all changes that have been made to the first instance of the data platform;

receiving, by the first instance of the data platform from the second instance of the data platform, a synchronization request, wherein the synchronization request includes a second vector associated with the second instances of the data platform;

determining, by the first instance of the data platform, that the second instance of the data platform does not include the change to the first change unit of the first item and the change to the parent change unit of the parent item in accordance with the second vector; and

transmitting, by the first instance of the data platform, the change to the parent change unit of the parent item prior to transmitting the change to the first change unit of the first item.

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2. (Currently amended)   The method of claim 1 wherein said change number comprises a unique identification number ~~for said instance~~ and a relative incremental count ~~of changes made to said instance~~.

3. (Currently amended)   The method of claim 1 wherein [[a]] the first instance of the data platform, to partially synchronize with [[a]] the second instance of the data platform, requests changes from said second instance of the data platform by sending to said second instance of the data platform its vector, and wherein said second instance of the data platform, based on the vector it receives from said first instance of the data platform, sends to said first instance of the data platform only those changes that said first vector has not yet received.

4. (Currently amended)   The method of claim 3 wherein said second instance of the data platform, based on the vector it receives from said first instance of the data platform, further determines that said first instance of the data platform has changes that said second instance of the data platform has not yet received, and sends its own vector to said first instance to request these changes, and wherein said first instance of the data platform, based on the vector it receives from said second instance of the data platform, sends to said second instance of the data platform only those changes that said second vector has not yet received.

5. (Currently amended)   The method of claim 1 wherein a first instance of the data platform, when changing a first Item to relate via a Relationship to a second Item that was not previously being synchronized, to send all change information pertaining to said second Item to [[a]] the second instance of the data platform when synchronizing with said second instance of the data platform ~~so that said second Item in said second instance is synchronized with said second Item in said first instance~~.

6. (Canceled)

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7. (Currently amended)   The method of claim 1 wherein, for an Item deleted by a first instance, a tombstone comprising the identification of the Item deleted is created, and said tombstone is sent as part of a synchronization to notify a second instance of the data platform to identify the Item to be deleted in said second instance of the data platform.

8. (Currently amended)   The method of claim 7 wherein, for a first instance of the data platform having a parent Item and a first child Item to said parent Item, when said child Item is deleted and then said parent Item is deleted, said first instance of the data platform sending only the change to said parent Item to a second instance during a synchronization where (a) the deletion of a parent Item automatically results in the deletion of all children Items for said parent or (b) the second instance of the data platform, receiving the tombstone for the parent Item, proceeds to delete the parent Item and automatically deletes the child Item.

9. (Currently amended)   The method of claim 1, wherein a first Relationship and a second Relationship of a first instance of the data platform swap names using a temporary name element such that, in order, (a) the name of the first Relationship is transferred to said temporary name element, (b) the name of the second Relationship is transferred to said first Relationship, and (c) said name stored in the temporary name element is copied to said second Relationship, and wherein said first instance of the data platform synchronizes with a second instance of the data platform and sends a duo of change units representing, in order, (i) the new name for said first Relationship and (ii) the new name for said second Relationship, and wherein effecting the first change of said duo of changes results in an attempted change having an error in the second instance because a result of said first change is for the first Relationship and the second Relationship having the same name, a method by which said second instance of the data platform proceed to copy said name of the first Relationship to a local temporary name element and:

if, during the synchronization, a subsequent change is received for copying the name of said second Relationship to said first relationship, then performing said change as well as also copying said name in said local temporary name element to said first Relationship; and

if, during the synchronization, a subsequent change is not received for copying the

name of said second Relationship to said first relationship, then raising a conflict regarding

for the attempted change.

　　　10. (Currently amended)　　The method of claim 1 wherein, for synchronization

between a first instance <u>of the data platform</u> on a storage platform that allows a dangling

relative reference and a second instance <u>of the data platform</u> on a storage platform that does

not allow a dangling relative reference that include at least one change to a relative reference

and at least one other change, sending said change to said relative references after said one

other changes.

　　　11. (Currently amended)　　A system implemented at least in part by a computing

device for synchronizing a plurality of instances for a data platform, said system comprising:

　　　<u>circuitry configured to effectuate an operating system that includes a file system

integrated with a database management program,</u>

　　　　　<u>the operating system configured to store data received from application

　　　programs in the file system as file streams, and the operating system configured

　　　generate Items associated with the file streams in the database management program</u> <s>a

　　　subsystem for storing a plurality of items in a first instance of a data platform,</s> each

　　　item stored in the <u>database management program of the operating system</u> <s>first

　　　instance</s> <u>including</u> <s>includes</s> at least one change unit,

　　　　　wherein the <u>database management program of the operating system</u> <s>data

　　　platform</s> is configured to track changes to change units<u> and sequentially store the

　　　changes to change units in first vector; and</u>

　　　<u>circuitry configured to transmit the first vector to a second computer system in

response to receiving a synchronization request</u>

　　　<s>a subsystem for storing, by the first instance of the data platform, a change to a first

change unit of a first item, wherein the first item is a child of a parent item and the first item

and the parent item are included in the plurality of items;</s>

　　　　　<s>a subsystem for storing, by the first instance of the data platform after the change to

the first change unit of the first item, a change to a parent change unit of the parent item;</s>

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~~a subsystem for uniquely enumerating, by the first instance of the data platform, changes in sequential order wherein each change is identified by a change number;~~

~~a subsystem for maintaining, by the first instance of the data platform, a separate vector, wherein the separate vector corresponds to the enumerated changes to the first instance of the data platform, and a most recent known change number of a second instance of the data platform, wherein the separate vector represents all changes that have been made to the first instance of the data platform;~~

~~a subsystem for receiving, by the first instance of the data platform from the second instance of the data platform, a synchronization request, wherein the synchronization request includes a second vector associated with the second instances of the data platform;~~

~~a subsystem for determining, by the first instance of the data platform, that the second instance of the data platform does not include the change to the first change unit of the first item and the change to the parent change unit of the parent item in accordance with the second vector; and~~

~~a subsystem for transmitting, by the first instance of the data platform, the change to the parent change unit of the parent item prior to transmitting the change to the first change unit of the first item.~~

12. (Currently amended)   The system of claim 11 wherein <u>the database management program integrated with the operating system includes a schema for the data, the schema defining a size of the change units</u> ~~said change number comprises a unique identification number for said instance and a relative incremental count of changes made to said instance~~.

13. (Currently amended)   The system of claim [[11]] <u>12, wherein an element of the schema is the smallest size of the change units that can be tracked by the database management program</u> ~~further comprising a subsystem wherein a first instance, to partially synchronize with a second instance, requests changes from said second instance by sending to said second instance its vector, and wherein said second instance, based on the vector it receives from said first instance, sends to said first instance only those changes that said first vector has not yet received~~.

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14. (Currently amended)   The system of claim [[13]] 11, wherein the database management program includes a conflict handler ~~further comprising a subsystem wherein said second instance, based on the vector it receives from said first instance, further determines that said first instance has changes that said second instance has not yet received, and sends its own vector to said first instance to request these changes, and wherein said first instance, based on the vector it receives from said second instance, sends to said second instance only those changes that said second vector has not yet received~~.

15. (Currently amended)   The system of claim 11 wherein the database management program integrated with the operating system is configured to change a ~~further comprising a subsystem wherein a first instance, when changing~~ a first Item to relate via a Relationship to a second Item ~~that was not previously being synchronized~~, and ~~to~~ send all change information pertaining to said second Item to the second computer system ~~a second instance when synchronizing with said second instance so that said second Item in said second instance is synchronized with said second Item in said first instance~~.

16. (Canceled)

17. (Currently amended)   The system of claim 11 wherein the database management program integrated with the operating system is configured to generate ~~further comprising a subsystem wherein, for an Item deleted by a first instance,~~ a tombstone for a deleted item, the tombstone comprising the identification of the Item deleted ~~is created~~, and said tombstone stored in the first vector ~~is sent as part of a synchronization to notify a second instance to identify the Item to be deleted in said second instance~~.

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18. (Currently amended)   The system of claim 17, wherein the database management program integrated with the operating system is further configured to generate relationships from ~~further comprising a subsystem wherein, for a first instance having a parent Item and~~ a first child Item to said parent Item, database management program further configured to detect that the parent Item has bend elected and in response to delete that the parent item has been deleted the database management program is configured to delete the child item, generate tombstones for both the parent and child item and store both tombstones in the first vector ~~when said child Item is deleted and then said parent Item is deleted, said first instance sending only the change to said parent Item to a second instance during a synchronization where (a) the deletion of a parent Item automatically results in the deletion of all children Items for said parent or (b) the second instance, receiving the tombstone for the parent Item, proceeds to delete the parent Item and automatically deletes the child Item~~.

19. (Currently amended)   The system of claim 11, wherein the database management program is further configured to store ~~further comprising a subsystem wherein~~ a first Relationship and a second Relationship, the database management program is further configured ~~of a first instance~~ swap names for the first and second relationships by using a temporary name element such that, in order, (a) the name of the first Relationship is transferred to said temporary name element, (b) the name of the second Relationship is transferred to said first Relationship, and (c) said name stored in the temporary name element is copied to said second Relationship, and wherein said first instance synchronizes with a second instance and sends a duo of change units representing, in order, (i) the new name for said first Relationship and (ii) the new name for said second Relationship, and wherein effecting the first change of said duo of changes results in an attempted change having an error in the second computer system ~~second instance~~ because a result of said first change is for the first Relationship and the second Relationship having the same name, a method by which said second instance proceed to copy said name of the first Relationship to a local temporary name element and:

if, during the synchronization, a subsequent change is received for copying the name of said second Relationship to said first relationship, then performing said change as well as also copying said name in said local temporary name element to said first Relationship; and

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if, during the synchronization, a subsequent change is not received for copying the name of said second Relationship to said first relationship, then raising a conflict regarding for the attempted change.

20. (Currently amended)   The system of claim 11, wherein the database management program integrated with the operating system is further configured to store further comprising a subsystem wherein, for synchronization between a first instance on a storage platform that allows a dangling relative reference and the database management program integrated with the operating system is further configured to synchronize with a second computer system that a second instance on a storage platform that does not allow a dangling relative reference that include at least one change to a relative reference and at least one other change by[[,]] sending said change to said relative references after said one other changes.

21. (Previously presented)   A computer-readable storage medium comprising computer-readable instructions for synchronizing a plurality of instances for a data platform, said computer-readable instructions comprising instructions for:

storing a plurality of items in a first instance of a data platform, each item stored in the first instance includes at least one change unit, wherein the data platform is configured to track changes to change units;

storing, by the first instance of the data platform, a change to a first change unit of a first item, wherein the first item is a child of a parent item and the first item and the parent item are included in the plurality of items;

storing, by the first instance of the data platform after the change to the first change unit of the first item, a change to a parent change unit of the parent item;

uniquely enumerating, by the first instance of the data platform, changes to change units in sequential order wherein each change is identified by a change number;

maintaining, by the first instance of the data platform, a separate vector, wherein the separate vector corresponds to the enumerated changes to the first instance of the data platform, and a most recent known change number of a second instance of the data platform,

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wherein the separate vector represents all changes that have been made to the first instance of the data platform;

receiving, by the first instance of the data platform from the second instance of the data platform, a synchronization request, wherein the synchronization request includes a second vector associated with the second instances of the data platform;

determining, by the first instance of the data platform, that the second instance of the data platform does not include the change to the first change unit of the first item and the change to the parent change unit of the parent item in accordance with the second vector; and

transmitting, by the first instance of the data platform, the change to the parent change unit of the parent item prior to transmitting the change to the first change unit of the first item.

22. (Currently amended)   The computer-readable storage medium of claim 21 further comprising instructions for said change number to comprises a unique identification number for said instance of the data platform and a relative incremental count of changes made to said instance.

23. (Currently amended)   The computer-readable storage medium of claim 21 further comprising instructions for partially synchronizing a first instance of the data platform with a second instance of the data platform with said first instance of the data platform requesting changes from said second instance of the data platform by sending to said second instance its vector, and wherein said second instance of the data platform, based on the vector it receives from said first instance of the data platform, sends to said first instance of the data platform only those changes that said first vector has not yet received.

24. (Currently amended)   The computer-readable storage medium of claim 23, wherein said second instance of the data platform, based on the vector it receives from said first instance, further comprises instructions for said second instance of the data platform to determine that said first instance of the data platform has changes that said second instance of the data platform has not yet received, and sends its own vector to said first instance of the data platform to request these changes, and wherein said first instance of the data platform,

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based on the vector it receives from said second instance _of the data platform,_ sends to said second instance _of the data platform_ only those changes that said second vector has not yet received.

25. (Currently amended)   The computer-readable storage medium of claim 21 further comprising instructions for a first instance _of the data platform,_ when changing a first Item to relate via a Relationship to a second Item that was not previously being synchronized, to send all change information pertaining to said second Item to a second instance _of the data platform_ when synchronizing with said second instance _of the data platform_ so that said second Item in said second instance _of the data platform_ is synchronized with said second Item in said first instance _of the data platform._

26. (Canceled)

27. (Currently amended)   The computer-readable storage medium of claim 21 further comprising instructions for wherein, for an Item deleted by a first instance _of the data platform,_ a tombstone comprising the identification of the Item deleted is created, and said tombstone is sent as part of a synchronization to notify a second instance _of the data platform_ to identify the Item to be deleted in said second instance _of the data platform._

28. (Currently amended)   The computer-readable storage medium of claim 27 further comprising instructions for wherein, for a first instance _of the data platform_ having a parent Item and a first child Item to said parent Item, when said child Item is deleted and then said parent Item is deleted, said first instance _of the data platform_ sending only the change to said parent Item to a second instance _of the data platform_ during a synchronization where (a) the deletion of a parent Item automatically results in the deletion of all children Items for said parent or (b) the second instance _of the data platform,_ receiving the tombstone for the parent Item, proceeds to delete the parent Item and automatically deletes the child Item.

29. (Currently amended)   The computer-readable storage medium of claim 21 further comprising instructions for, wherein a first Relationship and a second Relationship of

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a first instance of the data platform swap names using a temporary name element such that, in order, (a) the name of the first Relationship is transferred to said temporary name element, (b) the name of the second Relationship is transferred to said first Relationship, and (c) said name stored in the temporary name element is copied to said second Relationship, and wherein said first instance of the data platform synchronizes with a second instance of the data platform and sends a duo of change units representing, in order, (i) the new name for said first Relationship and (ii) the new name for said second Relationship, and wherein effecting the first change of said duo of changes results in an attempted change having an error in the second instance of the data platform because a result of said first change is for the first Relationship and the second Relationship having the same name, a method by which said second instance of the data platform proceed to copy said name of the first Relationship to a local temporary name element and:

if, during the synchronization, a subsequent change is received for copying the name of said second Relationship to said first relationship, then performing said change as well as also copying said name in said local temporary name element to said first Relationship; and

if, during the synchronization, a subsequent change is not received for copying the name of said second Relationship to said first relationship, then raising a conflict regarding for the attempted change.

30. (Currently amended)   The computer-readable storage medium of claim 21 further comprising instructions for wherein, for synchronization between a first instance of the data platform on a storage platform that allows a dangling relative reference and a second instance of the data platform on a storage platform that does not allow a dangling relative reference that include at least one change to a relative reference and at least one other change, sending said change to said relative references after said one other changes.